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The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

## Delayed Independence

It almost seems as if a conspiracy existed to delay the age at which the formal educational system lets go of a young scientist and allows him to be on his own. The process starts early. In 1947 one 5-year-old in four was in the first grade; now only one in eight is there, and school regulations are reducing even further the opportunity to enter first grade before the magic age of 6. Advancement by age rather than by ability or achievement is so commonly practiced that up through the age of compulsory attendance only about 5 percent or fewer are ahead of the normal grade level. (Even the 40 highly selected annual winners of the Science Service–Westinghouse Science Talent Search are usually right at the “proper” age for high school seniors.)

After high school some bright youngsters get a jump on their age mates by entering college with advanced standing, but they are a tiny fraction of the total, and few students graduate from college in less than 4 years.

After college, the time required to earn a doctor's degree has been increasing. The Office of Scientific Personnel of the National Academy of Sciences reports the mean lag between B.A. and Ph.D. in the physical sciences to have increased from 6.8 years in 1920–39 to 7.4 in 1950–59 and 7.8 in 1960–61. In the biological sciences the mean has increased from 8.0 years in 1920–39 to 8.3 in 1950–59 and 8.9 in 1960–61. In other fields the current lag is even greater: 10.4 years in the social sciences, 12.0 in the humanities and professional fields, and 15.2 in education. The delay is only partly due to professional work prior to receipt of the doctorate; the recipients of science doctorates in 1957–61 had spent a median of 2.9 years in such work between the B.A. and the Ph.D. Nor is earlier marriage an explanation. Candidates with one dependent (often a working wife) finish a bit younger than those with no dependents, and having one child is associated with only a minor delay.

After the Ph.D., for some, comes one final delay: a postdoctoral fellowship is offered to some of the ablest students. The experience may be valuable, and apprenticeship under a good master is a fine way to develop research competence, but, nevertheless, the effect is sometimes to add one more year to the training that precedes intellectual independence.

From start to finish, justifications are offered: delaying entrance to the first grade minimizes failure; regular progression lessens the danger of emotional difficulties; there is so much for the Ph.D. candidate to learn; a postdoctoral fellowship is a reward and an advantage. But all these practices postpone independence—the freedom to sink or swim as the young scientist's own abilities and ideas determine—and often postpone it beyond the age when he is most full of energy and fresh ideas.

Our goal should be the opposite. Acceleration is demonstrably advantageous for bright, eager students. At graduate and postdoctoral levels, the effort to teach everything is hopeless anyway. The most important lesson we can teach is how to learn for one's self. If we do not teach that, adding extra years of instruction and extra bits of knowledge will not long hide our failure.

President Johnson has called this “the educational Congress” because of the amount of new educational legislation that has been enacted. Help from the federal government and other sources is fine, but some problems can be solved only from within the educational system. Delayed independence is one. All that is needed, and the only solution, is to do more vigorously and concertedly what we already know to be desirable.—D.W.

# Science

## Delayed Independence

D. W.

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